

annual reports in organic synthesis—1983

edited by Martin J. O'Donnell and Louis Weiss

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Annual Reports in Organic Synthesis—1983

edited by

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PREFACE

One of the most difficult problems facing chemists today is that of "keeping up with the literature." For several reasons, the problem is particularly severe for the synthetic organic chemist. Bits of information of potential use are scattered throughout common chemistry journals and can be found in any paper, not just those dealing strictly with synthesis. Thus, synthetic chemists must read a large number of journals and must organize and index what they read to make the information available for future reference. All synthetic chemists do this; but the task is becoming more difficult each year as the flow of information increases.

The problem, however, is shared to some extent by all. Most organic chemists are at some time faced with the problem of synthesizing a desired material, and for many the problems are formidable. Nonspecialists faced with the synthetic problem are not likely to have kept pace with the developments in synthetic chemistry that may well solve their problems, and they will not have the necessary information in their files.

Thus, we felt that an organized annual review of synthetically useful information would prove beneficial to nearly all organic chemists, both specialist and nonspecialist in synthesis. It should help relieve some of the information-storage burden of the specialist and should enable the nonspecialist who is seeking help with a specific problem to become rapidly aware of recent synthetic advances. Ideally also, it should appear as promptly as possible after the close of the abstracting period. This year we have placed particular emphasis on keeping the abstracts as concise as possible, while indicating the generality of the reactions involved. We have tried to combine similar publications into inclusive abstracts, particularly in Chapter I. This practice has allowed us to include a larger number of references without a substantial increase in the book's length.

In producing *Annual Reports in Organic Synthesis—1983*, we have abstracted 47 primary chemistry journals, selecting useful synthetic advances. We have tried to present the information in an organized manner, emphasizing rapid visual retrieval. Only the common journals received by our libraries have been abstracted. Any journal received after March 1, 1984 will be covered in the next volume. We have also exercised selectivity in choosing which papers to abstract. Our general guidelines have been to include all reactions and methods that are new, synthetically useful, and reasonably general. Each entry is comprised primarily of structures, accompanied by very few comments. The purpose of this emphasis is to aid the reader in scanning the book. The mind is capable of absorbing a whole picture in an instant, but is considerably slowed by having to read sentences. If the pictures presented catch the reader's interest, he or she should then seek details from the original paper.

For the eighth year we have included a principal author index to aid the user. No subject index is included because to do so would greatly increase both the cost of the book and the lead time for publication. Instead, we have chosen to use an extensive table of contents. Chapters I–III are organized by reaction type and constitute a major part of the book. The organization of these sections is self-explanatory; thus, there should be no difficulty in locating a new method of oxidation or a new cyclo-propanation procedure. Chapter IV deals with methods of synthesizing heterocyclic systems and Chapter V covers the use of new protecting groups. Chapter VI is divided into three main parts and covers those synthetically useful transformations that do not fit easily into the first three chapters. The first part deals only with functional group synthesis; the second covers ring expansion and contraction; and the third involves useful multistep sequences, the individual steps of which may be well known. Future volumes of this series will maintain the present table of contents as much as possible. If no entry is found for a particular section, the last volume in which one appears will be cited in the table of contents.

Any undertaking of this type involves a series of compromises. We have chosen to emphasize reasonable cost, rapid publication, and rapid visual retrieval of information at the admitted expense of detail and beauty.

The arduous task of drawing the multitude of structures appearing in this review was carried out by Ms. Katy Krupa and Ms. Carol P. Bertram. We thank them very much for their efforts. We also thank William Bennett, Tonette Tucker, and Carol P. Bertram for aid in proofreading the manuscript.

MARTIN J. O'DONNELL
LOUIS WEISS

JOURNALS ABSTRACTED

Accounts of Chemical Research
Acta Chemica Scandinavica
Aldrichimica Acta
Angewandte Chemie International Edition in English
Australian Journal of Chemistry
Bulletin of the Chemical Society of Japan
Bulletin de Sociétés Chimiques Belges
Bulletin de la Société Chimique de France
Canadian Journal of Chemistry
Chemical Communications
Chemical and Pharmaceutical Bulletin
Chemical Reviews
Chemical Society Reviews
Chemische Berichte
Chemistry and Industry
Chemistry Letters
Collection of Czechoslovakian Chemical Communications
Comptes Rendus Hebdomadaires de Seances de l'Academie des Sciences (C)
Gazzetta Chimica Italiana
Helvetica Chimica Acta
Indian Journal of Chemistry
Journal of the American Chemical Society
Journal of Chemical Research
Journal of the Chemical Society (Perkin I)
Journal of the Chemical Society (Perkin II)
Journal of General Chemistry (USSR)
Journal of Heterocyclic Chemistry
Journal of Medicinal Chemistry
Journal of Organic Chemistry
Journal of Organic Chemistry (USSR)
Journal of Organometallic Chemistry
Journal für Praktische Chemie
Liebig's Annalen der Chemie
Monatshefte für Chemie
Nouveau Journal de Chimie
Organic Preparations and Procedures International
Organic Syntheses
Organometallics
Pure and Applied Chemistry
Recueil des Travaux Chimiques des Pays-bas
Russian Chemical Reviews
Synthesis
Synthetic Communications
Tetrahedron
Tetrahedron Letters
Topics in Current Chemistry
Zeitschrift für Chemie

GLOSSARY OF ABBREVIATIONS

Ac	acetyl	MOM	methoxymethyl
AIBN	azobisisobutyronitrile	Ms	methanesulfonyl
Ar	aryl	MSA	methanesulfonic acid
9-BBN	9-borabicyclo[3.3.1]nonane	MTM	methylthiomethyl
BOC (<i>t</i> -Boc)	<i>t</i> -butoxycarbonyl	NBS	<i>N</i> -bromosuccinimide
Bu	butyl	NCS	<i>N</i> -chlorosuccinimide
Bz	benzyl	NIS	<i>N</i> -iodosuccinimide
Cbz	benzyloxycarbonyl	Ni(R)	Raney Nickel
COD	1,5-cyclooctadiene	[O]	general oxidation
Cp	cyclopentadienyl	Ⓟ	polymeric backbone
CSA	camphorsulfonic acid	PCC	pyridinium chlorochromate
DABCO	1,4-diazabicyclo[2.2.2]octane	PDC	pyridinium dichromate
DBN	1,5-diazabicyclo[4.3.0]non-3-ene	Ph	phenyl
DBU	1,5-diazabicyclo[5.4.0]undec-5-ene	(Phen)	1,10-phenanthroline
DCC	dicyclohexylcarbodiimide	Phth	phthaloyl
DDQ	2,3-dichloro-5,6-dicyanobenzoquinone	PPA	polyphosphoric acid
de	diastereomeric excess	PPE	polyphosphate ester
DEAD	diethyl azodicarboxylate	Pr	propyl
DIBALH (DIBAL)	diisobutylaluminum hydride	Py, pyr	pyridine
DMAD	dimethyl acetylenedicarboxylate	PTC	phase-transfer catalysis
DMAP	4- <i>N,N</i> -dimethylaminopyridine	Q ⁺	quaternary ammonium
DME	1,2-dimethoxyethane	RT	room temperature
DMF	dimethylformamide	TBDMS	<i>t</i> -butyldimethylsilyl
DMSO	dimethyl sulfoxide	TCNQ	7,7,8,8-tetracyanoquinodimethane
E ⁺	general electrophile	Tf	trifluoromethane sulfonate
ee	enantiomeric excess	TFA	trifluoroacetic acid
Et	ethyl	TFAA	trifluoroacetic anhydride
Fp	η^5 -C ₅ H ₅ Fe(CO) ₂	THF	tetrahydrofuran
Hex	hexyl	THP	tetrahydropyran
HMPA, HMPT	hexamethyl phosphoramide (hexamethylphosphoric triamide)	TMEDA	tetramethylethylenediamine
h ν	irradiation with light	TMP	2,2,6,6-tetramethylpiperidine
KAPA	potassium 3-aminopropylamide	TMS	trimethylsilyl
L	triphenylphosphine ligand	Tol	tolyl
LAH	lithium aluminum hydride	Tr	trityl
LDA	lithium diisopropylamide	Ts, Tos	<i>p</i> -toluenesulfonyl
LICA	lithium isopropylcyclohexylamide	TSA	toluenesulfonic acid
LTA	lead tetraacetate	Z	benzyloxycarbonyl; also used for electron-withdrawing groups such as -CN, -COOR, etc.
MCPBA	<i>meta</i> -chloroperbenzoic acid	Δ	heat
Me	methyl	ϕ	phenyl
MEM	β -methoxyethoxymethyl	18-C-6	18-crown-6

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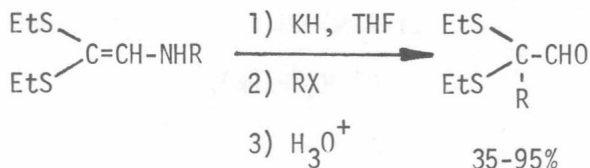
CARBON-CARBON BOND FORMING REACTIONS

I.A. Carbon-Carbon Single Bonds

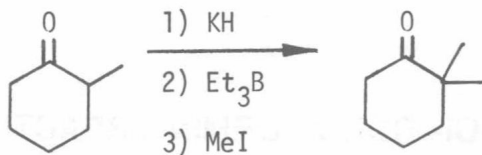
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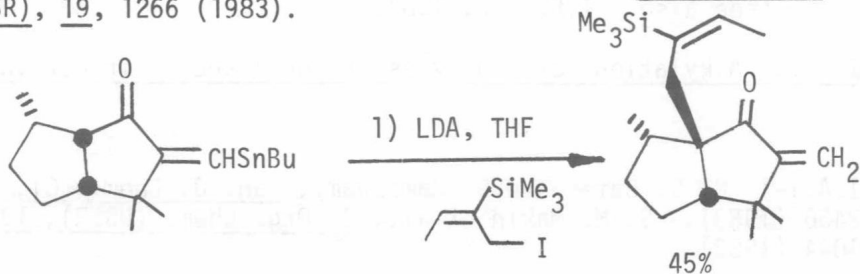


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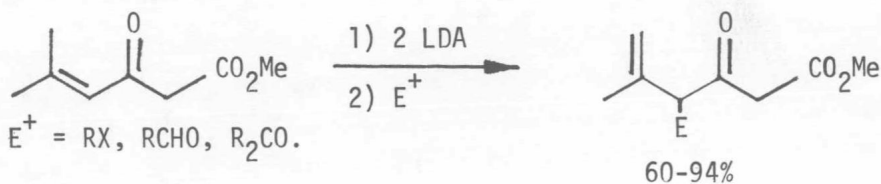
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Highly regioselective generation of "thermodynamic" enolates.

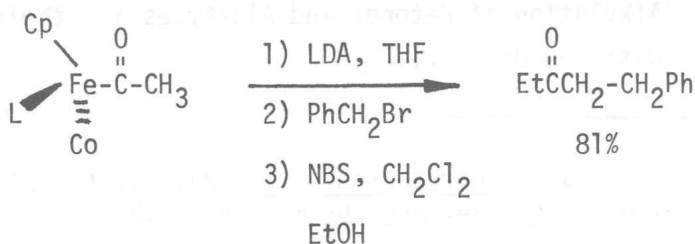
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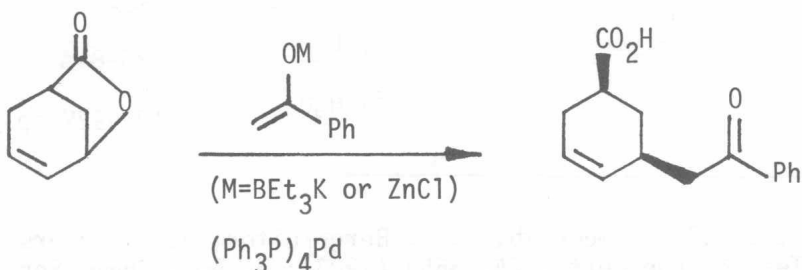
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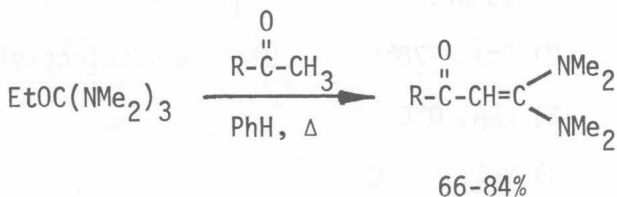


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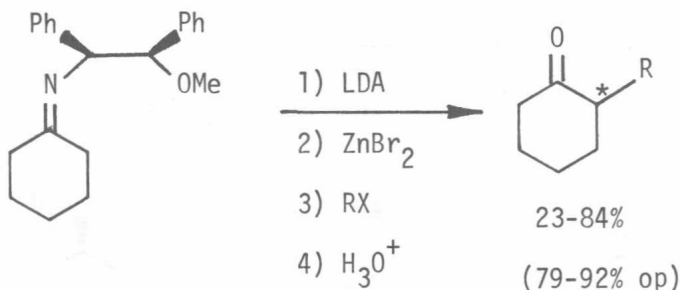
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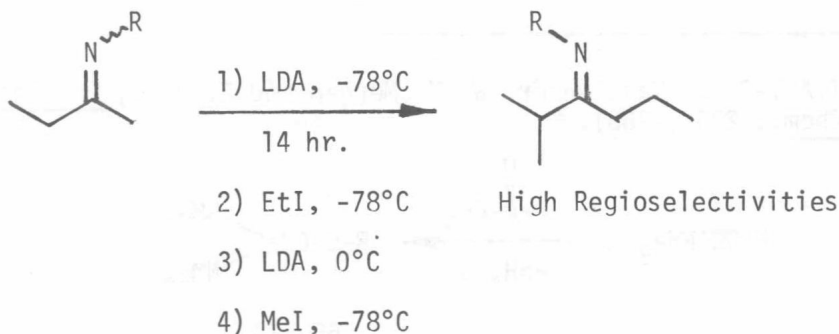
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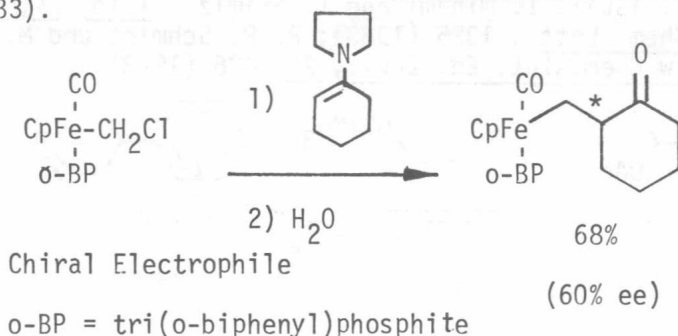
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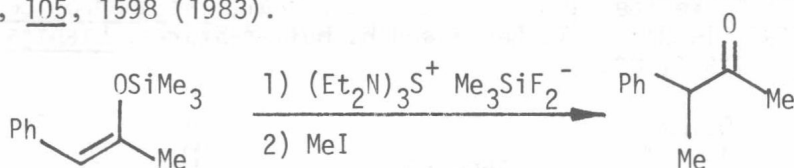
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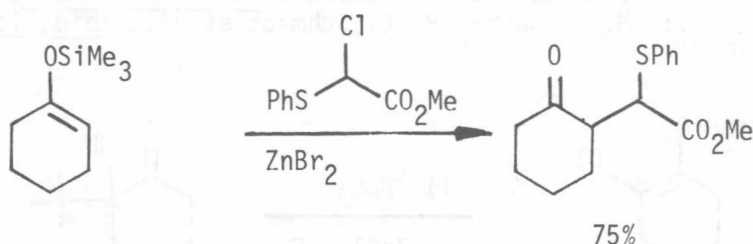
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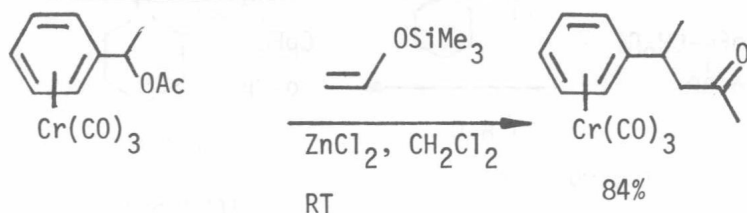


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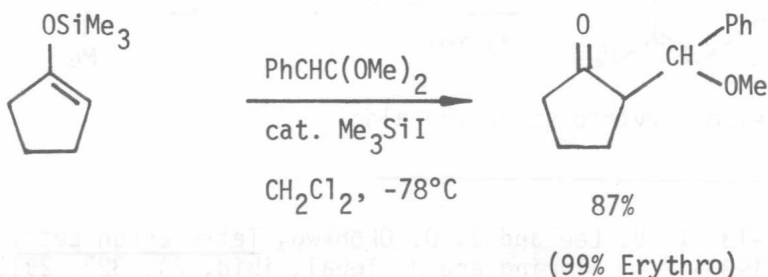


Products transformed to γ -ketoesters or unsaturated γ -ketoesters.

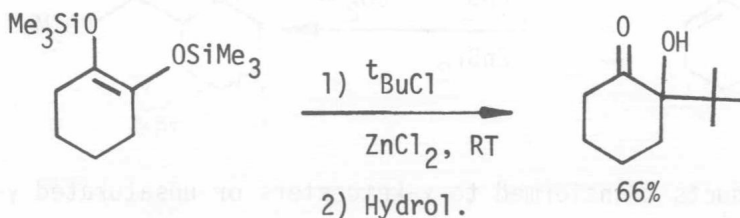
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